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ABSTRACT

This training unit on general information/orientation is part of a 17-unit course package written to aid instructors in the development, teaching, and evaluation of fire fighters in the Wisconsin Fire Service Certification Series. The purpose stated for the 8-hour unit is to familiarize fire fighters with the members of their class, the course, the facilities to be used, what will be expected of them, and what they can expect from the training agency. Other areas covered are history, traditions and organization of the fire service, and apparatus familiarization. An instructor's guide sheet provides this information: introduction to the topic, instructor preparation, length of unit, methods of instruction, testing, equipment and facilities required, recommended visual aids, and references. Following a list of unit objectives, a lesson plan outlines the main teaching points and states the preferred teaching method, cites the reference and page number(s) where the information is to be found, and indicates the necessary handouts. Other contents in the unit include a unit quiz, answer key to the quiz, and handouts (graphs, student worksheets, informational material, and forms). (Because of the wide scope of materials covered, this unit contains three lesson plans: orientation, history, traditions, and organization of the fire service; apparatus familiarization; and fire investigation.) (YLB)

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FIRE SERVICE CERTIFICATION SERIES

UNIT FSCS-FF-1-80

GENERAL/ORIENTATION

FIRE SERVICE TRAINING

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CONTENTS

	PAGE
INTRODUCTION	1
INSTRUCTOR GUIDE SHEETS	2
OBJECTIVES	3
LESSON PLANS	4-36
UNIT QUIZ	37-40
ANSWER KEY	41
APPENDIX	
HANDOUT MATERIALS	42-50

GENERAL/ORIENTATION

Prepared by:

Paul F. Pribyl, Consultant
Fire Service Training

INTRODUCTION

This unit has been developed to familiarize the fire fighters with the members of their class, the course, the facilities to be used, what will be expected of them, and what they can expect from the training agency.

Other areas to be covered are, history, traditions and organization of the fire service and apparatus familiarization. It should be noted that because of the wide scope of material to be covered, this unit contains a series of three lesson plans, one each, for orientation, history, traditions and organization of the fire service , apparatus familiarization and fire investigation.

INSTRUCTOR PREPARATION

Carefully study the objectives to determine the goals that have been set for the fire fighters upon completion of this unit.

Review the lesson plans and if necessary, consult the references listed.

Develop suitable audio-visual aids, provide training area and necessary tools and equipment to effectively teach this unit.

LENGTH OF UNIT

Classroom Work	7 hours	30 minutes
Evaluation and Testing		30 minutes

METHODS OF INSTRUCTION

Lecture and Illustration
Lecture and Discussion
Illistrated - Discussion
Lecture - Demonstration

Suggested methods and techniques are listed under Instructor's Notes on the lesson plans. For further information consult Fire Service Instructor Training IFSTA #303, 3rd ed., pp. 71-83

TESTING

At the end of this unit, a written quiz of five or more questions will be given.

EQUIPMENT AND FACILITIES REQUIRED

Classroom with necessary audio-visual equipment.

RECOMMENDED VISUAL AIDS FOR THIS UNIT

Old and new apparatus slides, pictures, books
Films: "Noble Breed" or "Combat"
Brady Company Pump Operation Transparencies
Manufacturers charts, cutaways, slides, etc.
NFPA Fire Investigation Slide Series

REFERENCES

1. Thomas, C.E., Ed. and Williams, Connie E., Fire Service Orientation and Indoctrination, 1st ed., #202 IFSTA, Stillwater, 1975 pp.15-40, 59-86

2. Hudiburg, E., Ed., Fire Service Training Programs, 2nd. ed., #203 IFSTA Stillwater, 1971, p. 133

3. Hudiburg, E. Ed., Fire Apparatus Practices, 5th ed., #106 IFSTA Stillwater, 1970, pp. 9-18, 51-103

4. Hudiburg, E., and,Thomas, C.E., Ed., Fire Prevention and Inspection Practices, 5th ed., #110 IFSTA, Stillwater, 1974 pp. 65-85

OBJECTIVES

All objectives in this unit are to be met according to the material contained in the International Fire Service Training Association Manuals #202 Fire Service Orientation and Indoctrination, #203 Fire Service Training Programs and #106 Fire Apparatus Practices.

To satisfactorily complete this unit, the fire fighter must attain a grade of 70 or higher on the written quiz.

NFPA STANDARD 1001

GENERAL

Fire Fighter I

3-1 General

3-1.1 The fire fighter shall demonstrate a knowledge of the organization of the fire department.

3-1.2 The fire fighter shall demonstrate knowledge as to the size of the fire department, the scope of its operation, and standard operating procedures.

3-1.3 The fire fighter shall demonstrate knowledge of the fire department rules and regulations that apply to the position of fire fighter.

Fire Fighter II

4-1 General

4-1.1 The fire fighter shall demonstrate responsibilities in determining the point of origen, cause and protection of evidence in fires of suspicious nature in accordance with the authority having jurisdiction.

4-1.2 The fire fighter shall demonstrate shutting off gas services to a building (Covered in practical skills test Unit 1)

4-1.3 The fire fighter shall demonstrate shutting off electrical service to a building (Covered in practical skills test Unit 1)

COURSE: FIRE SERVICE CERTIFICATION SERIES

LESSON: COURSE ORIENTATION

EQUIPMENT NEEDED: SLIDE, OVERHEAD, OR MOVIE PROJECTORS, SCREEN

TRAINING AIDS: SLIDES, TRANSPARENCIES, FILMS, TEXTS

INSTRUCTORS NOTES	TEACHING POINTS
LECTURE/ILLUSTRATED Note: Instructors should introduce themselves to the class and provide a short resume, i.e., Fire department and rank if other than VTAE district. Statement of experience and qualifications.	I. Outline of Course A. 208 hours of class time B. 18 subjects, 17 of which are covered in this course. C. Records to be kept 1. Course Completion - Form VEFT-1 & 4 2. Practical Skills Test - Form VEFT-2 3. Equivalency Requests - Form VEFT-3 4. Written Test Scores D. Complete registration of participants II. Facility Familiarization A. Location of classrooms and labs B. Drill or training facility location C. Location of rest rooms, eating facilities, vending machines, etc. D. Parking regulations III. Students Responsibilities A. Class schedule 1. Necessity of students reporting to classes on time. 2. The importance of completing assignments on time.

INSTRUCTORS NOTES | TEACHING POINTS

B. Reporting with proper equipment

1. Helmet
2. Bunker Coat
3. 3/4 boots
4. Gloves
5. Eye protection (Where required)
6. Such other equipment as may be required by the instructor or the needs of the course.

C. Conduct

1. In class - necessity for maintaining order and attention during classes.
2. Disciplinary Actions - (Where applicable)
3. Equipment/facility cleanup
4. Class breaks
5. Response to alarms during class

D. Safety

1. Safety must be enforced during course without Exception
2. Horseplay and clowning around during evolutions or classes will not be tolerated
3. Protective clothing must be worn during all evolutions.
4. Follow instructions implicitly - IF IN DOUBT, ASK the instructor to repeat them

IV. Responsibilities of Training Agency

A. Provide safe enviroment for conducting course

B. Validate and submit to the State Board the following records for each student.

1. Report of attendance
2. Quizzes and tests
3. Practical skills tests and overall proficiency

C. Enforce safety rules

INSTRUCTORS NOTES

TEACHING POINTS

D. Insure the objectives of the course are met

E. Assist the students, whenever possible in learning the material or with any other problems that may arise.

F. Advise students of methods to be used in reaching them in class if a personal emergency occurs.

V. Testing Procedures

A. Practical skills test and/or written quiz on each unit in course.

B. Written final examination - must attain a grade of 70%.

COURSE: FIRE SERVICE CERTIFICATION SERIES

LESSON: FIRE SERVICE ORGANIZATION

EQUIPMENT NEEDED: SLIDE, OVERHEAD PROJECTORS AND SCREEN

TRAINING AIDS: SLIDES, TRANSPARENCIES, TEXTS

INSTRUCTORS NOTES	TEACHING POINTS
Ref. IFSTA #202 Orientation and Indoctrination, 1st ed. pp. 15-39. IFSTA #201 Volunteer Fire Departments 5th ed., p.4	The earliest known firefighters protected the City of Rome Italy.
	After a disastrous fire that destroyed large portions of Rome in 6 A.D., the Emperor Augustus instituted the CORPS of VIGILES who were to protect Rome for the next 500 years.
P-16	The 7,000 member force was organized into districts and had a system of ranks for officers.
	The VIGILES were uniformed and equipped with buckets and axes.
	In addition to their fire suppression activities they performed police duties including the enforcement of fire prevention activities.
	The first known fire engine was invented in approximately the fourth century B.C. by a greek named Ctesibuis.
	This simple device remained the basic mechanical method that operated hand pumps until modern times.
	It is assumed that the VIGILES were provided with these engines as pieces of this equipment have been excavated at many sites in the area of their operations.
	After the fall of Rome, organized fire fighting disappeared for a 1000 years.
	In the 10th century, the first efforts to establish means of preventing fires were begun by requiring that all fires in structures be extinguished at nightfall.
P-17	A metal cover was used to extinguish the fire on the open hearth. The Norman French, called the cover a COUVRE FEU, which on the english toungues became CURFEW.
	The evening bell which tolled lights out came to be known as the "Curfew Bell" and this word is still a part of our language but has a different meaning.

INSTRUCTORS NOTES	TEACHING POINTS
	There is no record of organized fire fighting in the 11th and 12th centuries.
	Fires continued to plague the world and with this threat came the bucket brigade as an effort to organize fire suppression activities.
P-19	The first fire protection organization in America was formed by the Dutch Governor of New Amsterdam, Peter Stuyvesant.in 1647.
	The members of the force patrolled the streets of what is now New York carrying noisemakers that they used to awaken the populance when they discovered a fire.
	They were called:
	The Rattle Watch
	After the great fire of London in 1666, the first fire insurance companies were formed in England.
	These companies provided:
P-21	a. Fire marks to identify insured and protected property.
	b. Trained firefighters and salvagemen who protected insured premises only.
	These insurance company firefighters became England's first organized fire brigades.
	About this time, General Jan van der Heijden of Holland invented a new type of fire engine and sewn leather hose.
	A little later the most popular of the early engines, the "Newsham" was developed in 1721 by Richard Newsham. This machine was very effective and could be used by any size department or fire fighting force.
	The FIRST:
P-23	Fire Department Fire Station with Engine Paid Firefighters
	were placed in service by the City of Boston in 1679.
	By 1715, they had six engines manned and in service.
	The volunteer fire service as we know it today came into being through the forming of mutual protection societies

INSTRUCTORS NOTES

TEACHING POINTS

established in 1718 by interested and concerned Boston property owners.

This was the beginning of the volunteer fire service which has and continues to play such a large role in the protection of life and property in this country.

Each member of these societies would respond to an alarm of fire with their equipment:

bucket and bag bearing societies emblem

bed key

screw driver

Duties - during fires

Proceed to members premises

Prevent loss of life

Dismantle bed with key and remove valuables

Assist regular fire fighters

Duties - post fire

Guard premises and assist in salvage operations

1736 - First Volunteer Fire Company - The Union Volunteer Fire Company organized in Philadelphia by Ben Franklin.

P-24

1752 - First successful American fire insurance company organized in Philadelphia by Ben Franklin and friends.

Known as the PHILADELPHIA CONTRIBUTIONSHIP OF THE ASSURANCE OF HOUSES FROM LOSS BY FIRE.

Quite a mouthful for anyone but they were best known by the fire mark the company issued

The "HAND IN HAND"

As more fire insurance companies entered the field the fire marks became more varied.

Initially, the responding firefighters would only protect a premises that had their companies fire mark on it. As the volunteer forces grew in the United States and the insurance companies did not maintain their own fire

INSTRUCTORS NOTES

TEACHING POINTS

fighting force, they would pay the first company to put water on the fire.

In communities where fire marks were not used the first company to put water on the fire was reimbursed by the community itself.

This did create some problems between rival companys which generally eruppted into brawls and discredited the fire service.

While in the early 1800's the volunteer fire companies became beeter equipped:

engines
hose carts or wagons
ladder trucks

became larger and more efficient, the pride of each company grew and so did the rivalry.

Membership in the fire company of your community was a coveted privilege and the members of these units became a force to reckon with in both the social and political life of the period.

In some cases, this is true even today.

The era of the steam fire engine was upon us and in 1842 the New York Fire Department tried to introduce this innovative and more efficient method of fighting fires to the volunteers who would have nothing to do with this equipment.

P-34

Unfortunately, the attitude of the volunteers led to their downfall in the larger cities when the city of cincinnati became a paid department equipped with steam pumpers in 1851.

The rowdy volunteers of New York were replaced by paid firefighters in 1867. Reducing the 4000 part-time volunteer department to a full-time professional firefighting force of 583 men.

And in 1871 Philadelphia bid farewell to the last of their volunteer fire companys when the paid department was placed in service.

The new and improved fire apparatus available to the professional and volunteer fire departments alike now included horse drawn:

INSTRUCTORS NOTES

TEACHING POINTS

PP. 36-37

Steam Fire Engines - 300 GPM-500 GPM-600 GPM

Hose Reels and Wagons

Combination Chemical
and Hose Wagons

City Service Ladder Trucks

and in 1873 Mechanically
raised aerial ladders and
water towers.

As time progressed the combustion engine was utilized to propel fire apparatus.

First motorized fire apparatus - Wayne Pennsylvania 1906

The various cities start adding Christie and other makes of front drive motor units to former horse drawn engines and ladder trucks.

By 1920, most departments were motorized.

The last known run of a motorized steam pumper was by the New York Fire Department in 1941.

P-37

Standard uniforms were adopted by all the larger departments in the early 1800's.

Philadelphia - adopted a red shirt for their firefighters uniform in 1840.

Leather hats, which had been used as early as 1740 and included the "leather stove pipe" began to change in style.

By 1820, the fire helmet began to resemble those worn today. It had a front shield displaying the company number and the wearers initials and the brim was extended to the rear to protect the firefighter from scalding water and burning brands.

The frontpiece of the chiefs helmet was held in place by a "Phoenix" while those of the other members of the fire department had an eagle, bear, tiger, running fireman or other figure as the device to hold their shield in place.

INSTRUCTORS NOTES

TEACHING POINTS

Today the firefighter's helmet is made of "space age" materials and has very little resemblance to the original design.

The isignia of rank in the fire services essentially remains the same.

It is comprised of trumpets (sometimes referred to as bugles) or axes.

Originally the trumpets were used by all except ladder company officers who wore a single axe or in the case of a captain two axes in an upright position.

In most departments today the trumpets are used by all officers along with military insignia for company officers.

A single trumpet - Lieutenant

Two trumpets - Captain

Two crossed trumpets - Battalion or District Chief

Three crossed trumpets - Assistant Chief or Division Fire Marshal

Four crossed Trumpets - Deputy Fire Chief or 1st Deputy Chief Fire Marshal

Five crossed trumpets - Fire Chief or Chief Fire Marshal

Maltese cross or Patee-Nowy used as a cap device or coat badge is copied from the insignia worn by the knights during the crusades.

It is aptly chosen for a fire service insignia as it indicates the wearer is a member of an organizations dedicated to the assistance of the weak and helpless.

Ref. IFSTA #301, Fire Officer, 2nd ed. pp 9-20
IFSTA #202 Orientation and Indoctrination, 1st ed., pp. 63-68

ORGANIZATION

To organize is to:

ARRANGE INDEPENDENT PARTS INTO A FUNCTIONAL UNIT.

In the fire service, organization is the executive structure of personnel arranged around fire apparatus and firefighting equipment.

INSTRUCTORS NOTES

TEACHING POINTS

A GOOD ORGANIZATIONS STRUCTURE DOES NOT TAKE THE PLACE OF LEADERSHIP, IT MERELY PROVIDES A MEANS TO EXCERCISE CONTROL.

3-1 General

3-1.1 Covered in pp.
3-1.2 59-86 Fire Service
3-1.3 & Indoctrination
IFSTA #202

1. Principles of Organization

Organizations are made up of persons, not things and no realistic approach to organizational problems can afford to ignore this fact.

Some of the principles of organization are:

a. The work should be apportioned among the various individuals and units according to some logical plan.

b. The more complex the organizations, the more highly specilaized the division of work, the greater the need for coordination at the top.

c. Lines of authority and responsibility should be made as definite and direct as possible.

d. Authority should be commensurate with responsibility.

e. There should be "unity of command" thorughout.

f. There is a limit to the number of subordinates who can be effectively supervised by any one officer.

2. The Fire Service: A Function of Municipal Government

The fire department is one of several public service departments in municipal gaovernment, and its function is referred to as "The Fire Service".

A fire chief is generally the administrative head of the fire department and the duties of the position are defined by state statutes, city, village and town ordinances or both.

3. Line of Responsibility

Fire officers duties and responsibilities are divided into two operational divisions.

While the fire chief is the head of the department. certain phases of the chiefs authority may have to be delegated to the deputy and assistant chiefs to

INSTRUCTORS NOTES

TEACHING POINTS

insure continuity of operations, particularly in the absence of the chief.

In large departments, both paid and volunteer, the area to be protected may be divided into:

Battalions

Districts

these chiefs then are delegated authority by the chief of the department to act in their respective battalions or districts.

The line of responsibility requires officers to perform two types of leadership functions if the department is to be operated efficiently and effectively.

These two types of leadership are often referred to as:

"Line Officers and Staff Officers"

4. The Line Officer

A line officer normally directs the fire fighting and non-fire fighting functions of a fire unit or units.

This of course does not mean that the line officer cannot have responsibilities other than those referred to.

The following is an example of line officer organization in the fire department.

Fire Chief

Deputy Chief

Assistant Chief(s)

District or Battalion Chief(s)

Captains

Lieutenants

INSTRUCTORS NOTES

TEACHING POINTS

5. The Staff Officer

A staff officer performs administrative duties rather than fire fighting assignments.

Generally the staff officers will head bureaus or service divisions such as:

Bureau of Fire Prevention & Investigation
Training Division
Fire Alarm & Communications Bureau
Bureau of Repair & Maintenance
Bureau of Personnel

The workloads of the various bureaus or divisions will indicate whether it is essential to assign a full time staff officer, or whether a line officer can be given staff officer responsibilities in a particular area.

As a result you may find line officers assigned to some staff functions and staff officers assigned line duties. Staff officers also serve as advisors to the fire chief.

6. Examples of Organizational Plans

Give Handouts #1-2-3 to class

The type of fire department organization depends on the size of the community, the form of local government, and the scope of activities to be administered.

Good organizations are not confined to any particular form of local government, for in any community where the fundemental principles of organization are followed rather than consideration of political expediency, a good organizational plan is inevitable.

Class Assignment

Give Handout #4 to class and have each member complete an organizational chart of thier department

When the organizational plan is formulated, the administrative duties should be delegated to the:

Staff Officers

and

the fire fighting duties to the:

Line Officer

COURSE: FIRE SERVICE CERTIFICATION SERIES

LESSON: APPARATUS FAMILIARIZATION

EQUIPMENT NEEDED: SLIDE, OVERHEAD AND MOVIE PROJECTORS, SCREEN

TRAINING AIDS: SLIDES, TRANSPARENCIES, FILMS AND TEXTS

INSTRUCTORS NOTES	TEACHING POINTS
	During this section, the instructor should attempt to familiarize the fire fighter with the various types of apparatus used in the fire service and their major purposes including how a fire pump works and the apparatus and equipment checks that should be made. It should be kept in mind that this section is not designed to teach the fire fighter how to operate or drive the fire apparatus. If your fire department desires the fire fighter to become a driver/operator, a separate course based on National Professional Qualifications System Standard 1002, should be conducted for this purpose.
Ref. Fire Service Orientation and Indoctrination, 1st ed., IFSTA #202 P-44	I. Types and Purpose of Apparatus A. Pumpers 1. Pump capacity ranges from 500 to 1500 gallons per minute. Larger pump capacities can be specified when purchasing apparatus 2. Triple Combination Pumper - must have: a. hose compartment b. water tank - capacity ranges from 150 to 500 gallons with 300 gallons the average for city pumpers. c. fire pump 3. Equipment a. minimum of 24 foot extension ladder b. 14 foot roof ladder c. hose, nozzles and appliances d. forcible entry tools e. such other equipment as may be needed

INSTRUCTORS NOTES	TEACHING POINTS
Ref. Fire Service Orientation and Indoctrination, 1st ed., IFSTA #202	B. Aerial Ladders
P-45	1. Most units in U.S. Have ladders from 65 to 100 feet in height
	a. German and Japanese manufacturers build units of 164 feet in height
	2. Aerial Ladder chassis either:
	a. two axle (known as "four wheeled" or "straight frame")
	b. three axle (known as "six wheeled" or "tractor drawn")
	3. Ladders may midship or rear mounted
	4. Equipment
	a. 163 feet of ground ladders b. forcible entry tools c. rescue equipment d. other related equipment
	5. Primary purpose -
	a. rescue b. to gain access to higher levels c. to elevate master streams
P-46	C. Elevating Platforms/Aerial Towers
	1. Articulating Boom 50 to 90 feet in height 2. Telescoping Boom 85 feet in height
	a. Calavar Elevating Platforms are manufactured to heights of 150 feet
	3. Primary Purpose -
	a. rescue b. to gain access to higher levels c. to elevate master streams
P-46	D. Squad Apparatus
	The term "squad company" is from the original function of this unit as a squad of men to assist other companies. It should not be confused with the term "rescue squad".
	1. Manning will vary with the duties of the unit.

INSTRUCTORS NOTES

TEACHING POINTS

2. Equipment depends on utilization but could include:

   a. pre-connected lines 3/4 and 1-inch booster lines, 1 1/2 inch lines

   b. water tank 200-300 gallon capacity

   c. ladders

   d. nozzles and appliances

   e. first aid, respiratory and protective breathing equipment

   f. lights, portable extinguishers, salvage covers, tools, etc.

3. Primary purpose determined by department policy:

   a. "first in" attack vehicle
   b. equipment van
   c. salvage company
   d. "manpower" squad

Ref. Fire Service Orientation and Indoctrination, 1st ed., IFSTA #202

P-47

E. Tankers

1. Normally 500-3000 gallon water capacity

   a. some rural departments are using tractor drawn units with a 5000 to 9000 gallon capacity

2. Nurse tankers used to supply or refill crash trucks at aircraft emergency incidents

3. May be equipped with

   a. 250-500 gallon per minute pump (generally portable)

   b. hose of different sizes

   c. nozzles and appliances and other necessary equipment

4. Primary Purpose - the transportation of water for firefighting

INSTRUCTORS NOTES	TEACHING POINTS
Ref. Fire Apparatus Practices, 5th ed., IFSTA #106 P-13	F. Brush or Booster Apparatus 1. Equipment a. pump (portable or PTO) generally 250 gallon capacity b. water tank (gallonage varies) c. booster lines and/or forestry hose d. Indian pumps, brooms, shovels, rakes, mattocks, etc.
Ref. Fire Service Orientation and Indoctrination, 1st ed., IFSTA #202 P-48	G. Rescue Apparatus 1. Types a. ambulance b. light rescue c. heavy rescue 2. Todays ambulances must meet the DOT standards and the rescue units the needs perceived by ths department 3. Primary Purpose - Rescue and Extrication
Ref. Fire Apparatus Practices, 5th ed., IFSTA #106 P-15	H. Ambulances 1. Must meet DOT ambulance standards 2. Services regulated by EMT and Paramedic standards and licensing 3. Primary Purpose- the care and transportation of the critically ill and injured
Ref. Fire Service Orientation and Indoctrination, 1st ed., IFSTA #202 P-49	I. Aircraft Crash Rescue Apparatus 1. Types - Crash Rescue Vehicle a. equipped with rescue equipment and in some cases, extinguishing agents for use in establishing a rescue path 2. Crash Trucks a. single mobile units carrying a 2500 gallon water supplu and the ability to discharge additional extinguishing agents, AFFF, etc.

INSTRUCTORS NOTES	TEACHING POINTS
Ref. Fire Service Orientation and Indoctrination, 1st ed., IFSTA #202 P-49	b. has both trurrent and hadline stream capability 3. Foamer/Nurse Tanker a. supplies water to crash trucks b. foams runways 4. Primary Purpose - rescue and firefighting during incidents involving aircraft
P-50	J. Chemical Fire Apparatus 1. Originally horse-drawn, then motorized "first aid" apparatus carrying one ot two tanks of water and soda which when mixed with sulfuric acid expelled the water thru the apparatus 3/4 or 1-inch booster lines. a. used in areas where there were no hydrants and in small towns b. apparatus was lighter and could make a quicker response than the ponderous horse-drawn steamers or the early motorized pumpers 2. The development of more exotic fuels and flammable materials lead to the re-emergence of the chemical company a. normally equipped with specialized extinguishing agents, Afff, dry chemicals, carbon dioxide, metal-X, etc. 3. Generally found in departments covering large fuel tank storage areas or facilities where large amounts of flammable liquids, gases or combustible metals are stored or used. 4. Most departments have only occasional need for this type of apparatus and as a result have modified other apparatus currently in service to carry and dispense these agents. 5. Primary Purpose - to combat and control large fires in flammable liquids and combustible metals.

INSTRUCTORS NOTES	TEACHING POINTS
Ref. Fire Service Orientation and Indoctrination, 1st ed., IFSTA #202 P-50	K. Floodlight and Power Unit 1. Provide lighting and electrical powe for firefighting
Ref. Fire Apparatus Practices, 5th ed., IFSTA #106 P-17	L. Quad or Quint There has been considerable transition in ladder apparatus design and useage during the last fifty years. Evolving from the traditional "hook and Ladder" or "service truck" came the "Quad" or quadruple pumper. a. triple combination pumper on a long-wheelbase apparatus with a standard complement of ground ladders. Quads are no longer common in the fire service since the trend toward adding aerial ladders or elevating platforms to apparatus. With the addition of an aerial ladder or elevating platform, the apparatus become known as a "Quint". a. consists of an aerial ladder, elevating platform, or tower ladder with a standard complement of ground ladders, fire pump, water tank, hose compartments, all of which comply with the specifications set forth in NFPA Standard 1901.
Ref. Fire Service Orientation and Indoctrination, 1st ed., IFSTA #202 P-51	L. Hose Company 1. Not common, but may be employed in large departments. a. equipped with large amounts of hose of different sizes. b. designed to lay several lines simultaneously c. modification of beds or addition of reels permits the laying of larger diameter hose, 4,5 and 6 inch lines for supply.

INSTRUCTORS NOTES	TEACHING POINTS
Ref. Fire Apparatus Practices, 5th ed., IFSTA #106 P-17	N. Combination Pumper and Elevating Water Device Developments have been made in the design of fire apparatus which enables elevating nozzles to be installed on pumpers, hose tenders and other apparatus. a. articulating booms "Squirt" 50 feet in height b. telescoping booms "TeleSquirt" 50-75 feet in height with ladder Both units can be operated from the control panel at the base of the unit.
Ref. Fire Service Orientation and Indoctrination, 1st ed., IFSTA #202 P-52	O. Fire Boats 1. Designed to fight fires in ships, on wharfs,piers and docks. 2. Built in many sizes 3. Pump up to 20,000 gallons per minute.
P-53	P. Special Service Equipment includes but is not limited to: 1. Mobile Command Posts 2. Portable Mobile Arson Labs 3. Smoke Ejectors 4. Service Vehicles of the Alarm Bureau and Repair Shop 5. Air Cascade Units 6. HI-X Foam Units
Ref. Fire Apparatus Practices, 5th ed., IFSTA #106 PP. 51-94 PP. 52-55 PP. 56-60 PP. 68-70	II. Mechanical Principles of Pumps A. The Centrifugal Pump 1. Principle of operation 2. Staging 3. Pump drives

INSTRUCTORS NOTES	TEACHING POINTS
Ref. Fire Apparatus Practices, 5th ed., IFSTA #106	II. Mechanical Principles of Pumps cont.
	A. The Centrifugal Pump
	4. Controls and Devices
PP. 56-60	a. change over valves
PP. 70-71	b. connections
PP. 78-84	c. relief valves or governors
PP. 89-91	d. pump valves
PP. 84-89	e. priming devices
PP. 89-91	f. gauges
PP. 91-94	g. auxiliary cooling systems
PP. 75-78	5. Getting Water Into the Pump
	a. pressurized sources
	b. gravity
	c. drafting
P-9	6. Sizes and types of Pumps - 500-1500 GPM Must Pump
	a. rated capacity at 150 p.s.i.
	b. 70% of rated capacity at 200 p.s.i.
	c. 50% of rated capacity at 250 p.s.i.
PP. 135-137	III. Apparatus Maintenance
P-135	A. Daily Maintenance
	a. check crankcase oil for proper level
	b. observe water level in radiator
	c. check all batteries

INSTRUCTORS NOTES	TEACHING POINTS
Ref. Fire Apparatus Practices, 5th ed., IFSTA #106	III. Apparatus Maintenance cont.
P-135	A. Daily Maintenance
	d. check all visible and audible warning signals
	e. check all fuel tanks for fuel level
	f. check booster tanks for water level
	g. check each tire for cuts, breaks and inflation
	h. pressure test all brakes
	i. clean apparatus body
P-137	IV. Equipment Maintenance
	A. Daily Maintenance
	a. check all portable extinguishers for service
	b. check all hose loads for service
	c. check all ladders for service
	d. check all nozzles, appliances and tools for service
	e. check air pressure in protective breathing apparatus

COURSE: FIRE SERVICE CERTIFICATION SERIES

LESSON: FIRE INVESTIGATION

EQUIPMENT NEEDED: SLIDE AND OVERHEAD PROJECTOR, SCREEN

TRAINING AIDS: SLIDES, TRANSPARENCIES AND TEXTS

INSTRUCTORS NOTES	TEACHING POINTS
Ref. Fire Investigation, Paul L. Kirk, John Wiley & sons Inc. New York, NY 1969 pp. 138-146 P.-138 Ref. Fire Prevention and Inspection Practices, 4th ed., IFSTA #110 pp. 65-83 P.-65 4-1 General 4-1.1 covered in pp. 65-83 Fire Prevention and Inspection Practices IFSTA #110 4-1.2 Covered in practical 4-1.3 skills test Unit 1	Fire Investigation One of the investigators most difficult problems is to determine the cause of a fire, since flames will generally consume much of the evidence. For this reason, the cause of most fires cannot be determined without a careful investigation. Yet, in spite of this, firefighters often make snap judgements at the scene as to the cause of the fire, without adequate evidence or sufficient investigation on which to base their decision. Apparently there is a natural reluctance for a fire fighter to admit that they do not know the cause of the fire. A fire may be attributed to various causes without apparent regard to actual evidence or the lack of it. I. Procedure A. A routine investigation that is generally applicable or subject to suitable modification is as follows: 1. View the burned structure from the outside first, preferably from all sides, and evaluate as to the following points: a. Extent and intensity of the fire as indicated by general destruction. b. Character of the destroyed portions, such as roofs and walls. c. Outlets of fire from structure, e.g., through windows or hole in roof. d. Type of exterior construction, roof, walls and other residual structures.

INSTRUCTORS NOTES

TEACHING POINTS

Ref. Fire Prevention and Inspection Practices, 4th ed., IFSTA #110

pp. 70-72

Examine the Interior of the Building

Conduct a general survey of the entire structure interior for the extent of fire damage.

During this examination establish the possible fire duration (brief or long) and the approximate time of ignition.

1. Window Glass Condition

   a. heavy baked-on smoke stains and a varnish-like or flat balck paint appearance with large cracks in the glass, indicate a:

      LONG SMOULDERING FIRE WITH A PROPORTIONATELY SLOW HEAT BUILDUP.

   b. heavy baked-on smoke stains with a varnish-like flat black paint appearance, combined with crased glass is indicative of:

      A FIRE WHICH WAS INITIALLY A SLOW SMOULDERING FIRE THAT MAY HAVE VENTED ITSELF OR OTHERWISE ACCELERATED AND RESULTED IN A FAST OR RAPID HEAT BUILDUP DURING ITS LATTER STAGES.

   c. heavy carbon or soot deposits that wipe off easily combined with large cracks is a condition which indicates:

      A SHORT OR MEDIUM DURATION FIRE POSSIBLY ACCELERATED WITH A HYDROCARBON SUCH AS GASOLINE.

   d. differentiate between glass that has been broken by heat and glass that has been broken by force.

      glass melts as about 850 degrees F. and if the glass has melted instead of breaking, the heat buildup was probably gradual with relatively even temperature on both sides.

2. Depth of Wood Char

   The following general rule may be used as a guide for estimating the approximate time the building was involved.

   WITH FLAME EXPOSURE TO ONE SIDE AT AN AVERAGE COMBUSTION TEMPERATURE OF 1,400 DEGREES F., WOOD CHARS OR BURNS AT A RATE OF ABOUT ONE INCH IN 45 MINUTES

INSTRUCTORS NOTES

TEACHING POINTS

pp.70-72

2. Depth of Wood Char cont.

   The wood char depth may be measured by carefully inserting a pen knife or similar tool into the char until resistance is met (uncharred wood) and then measuring the depth of penetration.

3. Determine which room or area has received the most severe fire damage.

   a. generally the room or area where fire burned the longest

   b. frequently the room or area of origin.

   c. examine and compare the bottom side of tables, shelves and chairs to determine the level of origin within the room.

4. Examine the ceiling and look for the following patterns:

   a. fire penetration

   b. heaviest fire exposure

   Considering that fire and heat travel upward, it could be that the fire burned for the longest period of time beneath a point of fire penetration which may indicate origin.

   Do not be misled by combustibles that burn with intense heat.

5. Examine light bulbs within the room. Light bulbs begin to swell and lose shape at about 900 degrees F. when exposed to heat fro ten minutes or more.

   The side of the bulb which is initially exposed to heat may swell or bulge and actually point to the area of fire origin.

6. Examine walls within the room and look for fire patterns or fire cones.

   Keeping in mind that fires generally burn upward and outward, they leave corresponding fire patterns on walls as a result of heat transfer through convection and radiation.

   The steepness of relative pitch of the angle seen on the fire cone is indicative of the type of burning, i.e., smouldering or flaming.

INSTRUCTORS NOTES	TEACHING POINTS
P-75	7. Examine fire debris: a. one section of floor at a time b. layer by layer When finished the floor and covering should be clean enough to observe and photograph significant burn and char patterns.
P-76	8. Examine the floor area for: a. charred areas which correspond to a badly destroyed piece of furniture b. determine if the fire came from beneath the floor or if it burned downward in a burn-through hole. this may be established by examining the edges of the burn-through portion and determining the pitch or angle of the edge. A puddle-shaped burn and char pattern with a sharp line of demarcation between damaged and undamaged portions, combined with flammable liquid odors, would be indicative of a flammable liquid having burned on the floor. Flammable liquids (hydrocarbons) may leave a residue that can be identified by a chemical analysis. Irregular shaped burn and char patterns adjacent to doors and windows, although similiar to flammable liquid patterns, may actually be caused by the convected heat currents resulting in more intense burning because of the fresh oxygen supply at these locations. Foam rubber cushions or rug pad can produce deep heavy charring without the fingers of a puddle-shaped burn pattern. When foam rubber is involved in a fire: a. it melts and becomes a surface buring material b. it spreads very little as it burns c. it does burn with great intesity in concentrated forms at floor level

INSTRUCTORS NOTES	TEACHING POINTS
P-76	Compare the depth of floor char to ceiling damage. If the floor is charred or damaged to a greater extent than the ceiling: THIS MAY INDICATE A FLAMMABLE SUBSTANCE AT FLOOR LEVEL In the average fire, the floor temperatures are generally about one third that of ceiling temperatures. Spall patterns (concrete floors) which have a characteristic puddle shape with a thin brown heat stain parallel to the edge, are indicative of a flammable liquid spill. The word spall means to break off into chips, scales or slabs from the surface of a material such as stone, metal or concrete as a result of rapid temperature change. This condition may be observed when a considerable amount of certain flammable liquids burn on the surface of a concrete florr, causing the concrete to spall away in the general shpe of a puddle. Two general types of burn patterns may be encountered in upholstered furniture: a. couches b. chairs c. beds 1. One may involve only surface burning of the item with consistent damage over the surface. Examination of supporting springs will disclose that tension still exists. 2. Another pattern may involve a deep penetration of one portion with corresponding collapse of springs and frame destruction. Spring collapse is caused when heating process occurs over an extended length of time, which takes the temper from the spring steel. If the cabinet of a televison or radio is destroyed and with the chassis and components melted with corresponding burn and char patterns on the wall and flo it is inidcative of origin and a careful examination of the debris should be made to determine if the appliance was in fact plugged in. Cooking fires which originate on ranges are readily identified by the distinctive fire cone coming

INSTRUCTORS NOTES	TEACHING POINTS
P-77	upward from the burner involved. These fires will generally make rapid progress because of their open flame nature, and damage to the kitchen area will be extensive. When an electrical wire is pulled apart with no current flowing, the ends will fit together again with a cup effect on one end and a cone effect on the other. Two wedge like ends remain if the wire has been cut. If, however, the wire is carrying electrical current at the time of break, both ends will be fused and the ends distorted by the arcing of current at the instant the break occurs.
Refer to Fig. 1 Handout #1	If electrical wire is burned as a result of heat from the outside of the wire, the insulation will be burned away - but an investigation of the wire where the insulation is not completely detroyed will disclose that the wire is clean and bright. If an electrical wire is burned as a result of excessive current, the wire will be dark and show evidence of oxidation even in a section where there is no evidence of damage to the insulation.
P-78	II. Determining the Fire Cause No analytical process or practical system of survey ever devised will serve as a substitute for good judgement. The judgement that a person uses, when determining the cause of a fire, must be based upon a background of technical information and general knowledge of fire hazards and causes
Refer to Fig. 1 HANDOUT #2-3	A "FIRE HAZARD" MAY BE DEFINED AS ANY MATERIAL, CONDITION OR ACT THAT WILL CONTRIBUTE TO THE START OF FIRE OR WILL INCREASE THE EXTENT AND SEVERITY OF A FIRE.

INSTRUCTORS NOTES

TEACHING POINTS

A "FIRE CAUSE" INVOLVES THREE CONTROLLABLE CONDITIONS:

1. THE FUEL SUPPLY
2. THE HEAT SOURCE
3. THE HAZARDOUS ACT

A FIRE IS CAUSED WHEN THE FUEL SUPPLY AND THE HEAT SOURCE ARE BROUGHT TOGETHER BY SOME HAZARDOUS ACT.

When collecting information during a survey there are always basic general facts which are known., they should be recorded and used to substantiate a final analysis.

P-79

GENERAL FACTS

Refer to Fig. 1
HANDOUT #4

Location

1. Street address
2. City, village or town
3. Name of person making survey
4. Date of Survey
5. Occupancy
6. Date of fire
7. Time of fire

Weather (at time of fire)

8. Wind velocity
9. Wind direction
10. Humidity
11. Atmospheric temperature
12. Conditions
    a. rain
    b. ice
    c. snow
    d. thunderstorm
    e. clear
13. Other conditions

INSTRUCTORS NOTES

TEACHING POINTS

Ref. Fire Prevention and Inspection Practices, 4th ed., IFSTA #110 pp. 65-83

P-79

14. Occupancy of the Buiding

a. assembly
b. high hazard
c. mercantile
d. business
e. industrial
f. residential
g. educational
h. institutional
i. storage
j. mixed (describe)
k. other

15. Materials of construction (examples)

a. concrete block
b. stone
c. brick
d. brick veneer
e. wood frame
f. wood frame-iron clad
g. metal frame-iron clad
h. hollow tile

P-79

III. Locating the Area of Origin

It is a natural tendency for the person who is making the survey to quickly locate a point or definite place in the burned-out area which appears to be the place where the fire started.

Using the following guide as an outline to help locate the area of origin will further provide evidence both circumstntial and factual, for the subsequent step of locating the point of origin.

AREA OF ORIGIN

1. Section of building damaged (by)

a. fire
b. heat
c. explosion

2. Highest point of fire travel
3. Physical state of fuel burned

a. heavy solids
b. gaseous
c. flimsy solids
d. flammable liquids

INSTRUCTORS NOTES

TEACHING POINTS

P-80

Refer to Fig. 1
HANDOUT #5

4. Fire travel through openings

   a. vertical
   b. horizontal
   c. walls
   d. ceilings
   e. floors

5. Heat transfer by

   a. conduction
   b. convection
   c. radiation
   d. flame contact

6. Burn through points

   a. interior
   b. exterior

7. Heat indications - location of greatest amount

8. Depth of char

9. Heat intensity

10. Spalled building materials

11. Burning

12. Location of heat line

13. Location of area of origin

P-81

Refer to Fig. 1
HANDOUT #6

IV. Locating the Point of Origin

The following guide for locating the point of origin has proved successful in a majority of survey cases.

POINT OF ORIGIN

A. Occupants opinion of where the fire started

   1. What is the logical fuel source at this point ?

   2. What is the logical heat source that caused ignition at this point ?

INSTRUCTORS NOTES

TEACHING POINTS

P-81

POINT OF ORIGIN cont.

B. Point of greatest burning intensity

1. Determined by:

a. fire load
b. depth of char
c. spalled materials
d. melted materials

2. What is the logical fuel source at this point ?

C. Point of lowest burning

1. What is the logical fuel source at this point?

2. What is the logical heat source that caused ignition at this point ?

D. Path of fire travel

1. From
2. To
3. What is the logical fuel source in this path ?
4. What is the logical heat source that caused ignition in this path ?

FROM THE LOGICAL FUEL AND HEAT SOURCES THAT CAUSED IGNITION WHICH HAVE BEEN ESTABLISHED IN A,B,C, AND D:

LOCATE POINT OF ORIGIN

PP-82-83

V. The Cause of Fire

When the cause of a fire is being determined, both the fuel involved and heat source that caused ignition must be considered.

Refer to Fig. 1
HANDOUT #7

Fires do not start without cause, and the cause is always present.

Fire department personnel should judge fuel hazards and heat hazards by their characteristics.

REMEMBER !!!

A fire is caused ONLY when fuel and heat come together and both the fuel and heat that started the fire should be entered into the records as the fire cause.

INSTRUCTORS NOTES	TEACHING POINTS
P-82	The following indications serve as clues which will lead to the cause of a fire. If evidence cannot be found that falls into one of the categories listed, examine the point of origin for othe possible fuel and heat sources. 1. Occupants opinion of how fire started. 2. Occupants description of all materials at point of origin. 3. Information from firefighters, citizens and neighbors. 4. Personal study of fuel and heat sources at point of origin. Look for physical indications of the following: A. EXPLOSION 1. Explosions usually involve combustible gases, flammable liquid vapors, or explosives. B. FLASH FIRE 1. Evidence of scorched materials over a wide area and not deeply charred. 2. Flash fires usually involve flammable vapors, gases or flimsy solids. C, EXTERMELY HOT FIRES 1. Evidence of deep char, spalled materials and melted materials. 2. This type of fire usually involves fuels of high Btu content, such as oils, greases, chemicals, rubber and combustible metals. D. ELECTRICAL FIRES This type of fire involves fires in electrical appliances, such as overheated irons, motors, wiring, TV sets and radios. E. HEATING APPLIANCE FIRES Heating appliances has reference to furnaces, stoves, wall heaters, space heaters and cook stoves. F. INCENDIARY FIRES Includes all fires that are not accidental in nature

INSTRUCTORS NOTES	TEACHING POINTS
Ref. Fire Fighter's Responsibility in Arson Detection, NFPA 615M, 1971 P-21	VI. Protecting and Preserving Evidence A. Two things to remember !!! 1. Leave where it is and notify superior officer and investigators. 2. If not, identify, remove and safeguard. B. Protect and guard evidence. 1. Rope off area. 2. Have area under guard. C. Identify, preserve, remove and safeguard evidence. 1. Photograph where found. 2. Then mark, tag and identify. 3. Place in clean containers and label, date, time, place, where found, by whom, witness. 4. Maintain evidence chain.

UNIT QUIZ

1. A total of _____ subjects will be covered in this course.

2. In order to meet the requirements for certification as a Certified Fire Fighter, you must pass all practical skills tests and attain a grade of ___ on all unit quizzes and the final examination.

3. In the space provided, draw an organizational design of your department.

4. Define in your own words, the term "line functions" of officers in your department.

_____

_____

_____

5. List two "staff functions" performed by officers of your department.

_____

_____

_____

6. Name five types of fire apparatus.

_____

_____

_____

_____

_____

7. The major purpose of a fire department pumper is to:

(Circle the letter at the correct answer)

a. carry firefighters and equipment to the fire scene

b. carry hose, water and a pump

c. provide adequate pressure for fire streams

d. provide means of escape from elevated areas.

8. A compound gauge is used to measure:

(Circle letter at correct answer)

a. discharge pressure for a fire stream.

b. pump speed in revolutions per minute.

c. vacuum developed by apparatus engine.

d. incoming pressure or vaccuum.

9. In order to draft water with a centrifugal pump, it is necessary to create:

(Circle letter at correct answer)

a. positive pressure

b. a vacuum

c. an internal pressure

d. an external pressure

10. At what pressure must a fire department pumper pump its rated capacity:

    (Circle letter at correct answer)

    a. 150 p.s.i.

    b. 200 p.s.i.

    c. 250 p.s.i.

    d. 300 p.s.i.

11. A rated fire department pumper must pump 70% of its capacity at:

    (Circle letter at correct answer)

    a. 150 p.s.i.

    b. 200 p.s.i.

    c. 250 p.s.i.

    d. 300 p.s.i.

12. A rated fire department pumper maintaining a pump pressure of 250 p.s.i. per minute is operating at _____% of its capacity.

13. To be rated as a triple combination pumper, the apparatus shall be equipped with:

    _____

    _____

    _____

14. Rated fire department pumpers must carry a _____ foot extension ladder and _____ foot roof ladder to meet minimum requirements.

15. The "Transfer" or Change-Over Valve" is used to change the pump operation from _____ to _____.

16. What size pump inlets are required on a fire department pumper of 750 gallon per minute capacity:

    (Circle letter at correct answer)

    a. 6-inch

    b. 4-inch

    c. 4 1/2-inch

    d. 5-inch

17. You discover evidence of a suspicious fire, your FIRST responsibility as a firefighter is to:

(Circle letter at correct answer)

a. mark, tag and preserve the evidence

b. identify, remove and safeguard evidence

c. report it to your superior officer

d. photograph the evidence

18. List two ways to protect and guard evidence at a suspicious fire:

_____

_____

19. List two ways to identify and preserve evidence at a suspicious fire:

_____

_____

20. The priming device on a centrifugal pump is used to_____

_____from the pump and intake hose. (Hard or Soft suction)

ANSWER KEY

1. 17

2. 70

3. Dependent on department

4. Line - firefighting duties

5. Fire Prevention
   Alarm Bureau
   Administration
   Bureau of Training
   Bureau of Maintenance
   Bureau of Investigation

6. pumper-triple combination
   aerial ladder
   tower ladder
   elevating platform
   squad or equipment truck
   rescue vehicle
   quad
   quint
   fire boat
   crash truck
   tanker
   brush or booster
   ambulance
   chemical
   power/flood light
   squirt/telesquirt
   air cascade

7. c.

8. d.

9. b.

10. 150 p.s.i.

11. 200 p.s.i.

12. 50%

13. hose bed
    water tank
    fire pump

14. 24 foot extension
    14 foot roof

15. volume to pressure
    pressure to volume
    capacity to pressure
    pressure to capacity

16. 5-inch

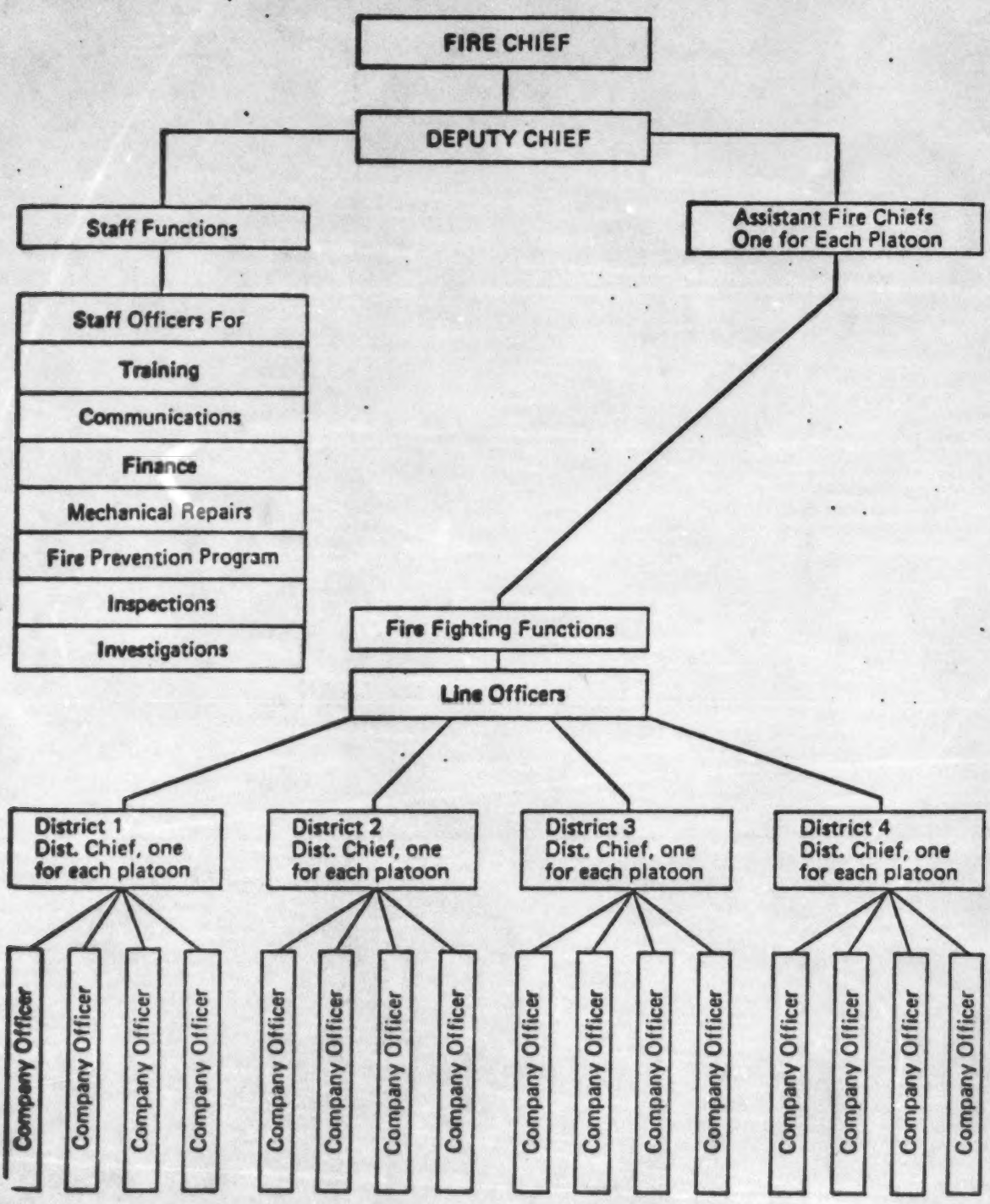
17. c.

18. Rope off area
    Secure area
    Have area under guard

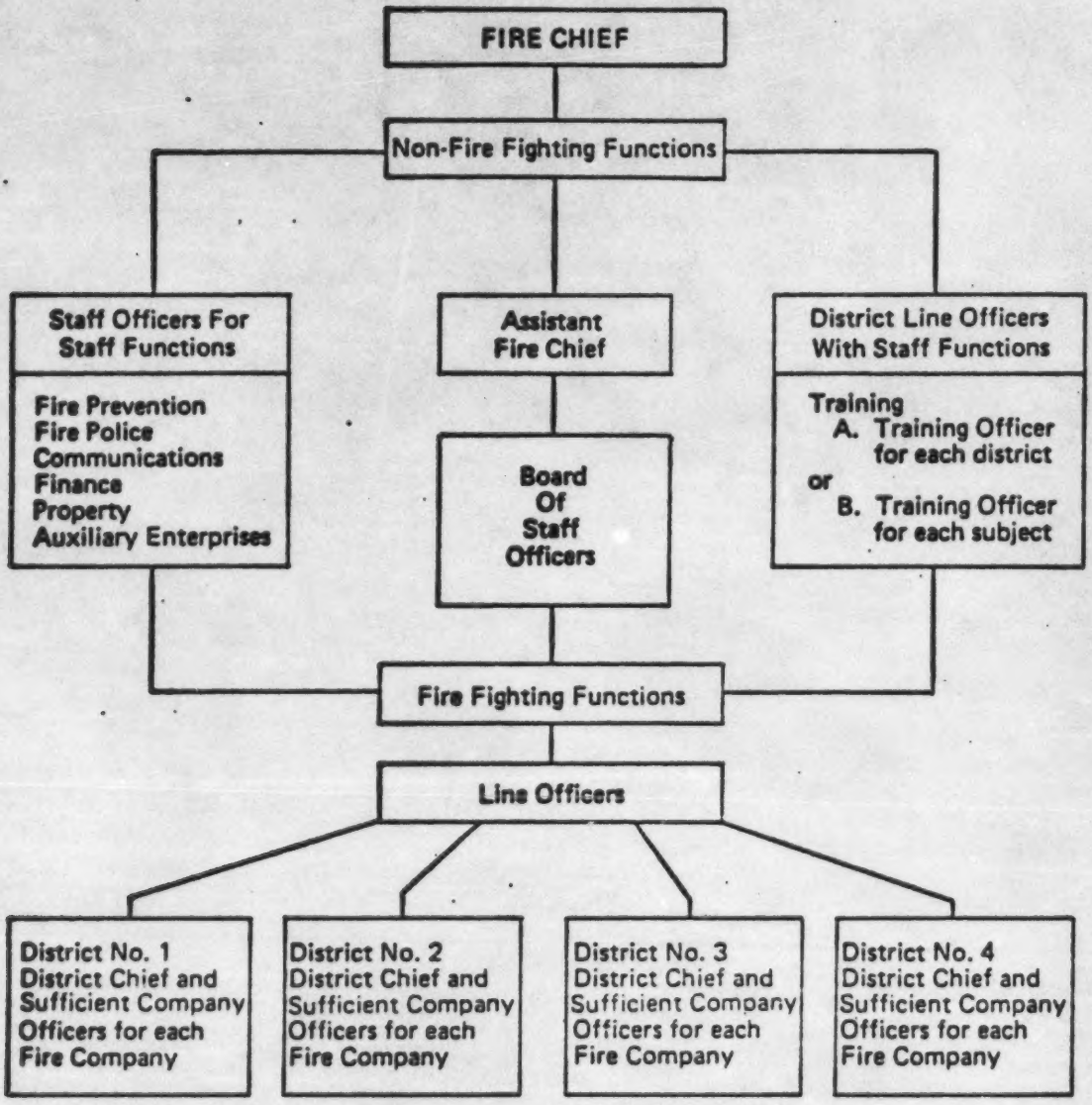
19. Photograph where found
    mark, tag and identify
    place in clean container
    and label including date,
    time, place, where found,
    witnesses
    maintain evidence chain

20. Exhaust/remove air

A TYPICAL ORGANIZATION CHART FOR A LARGE PAID FIRE DEPARTMENT

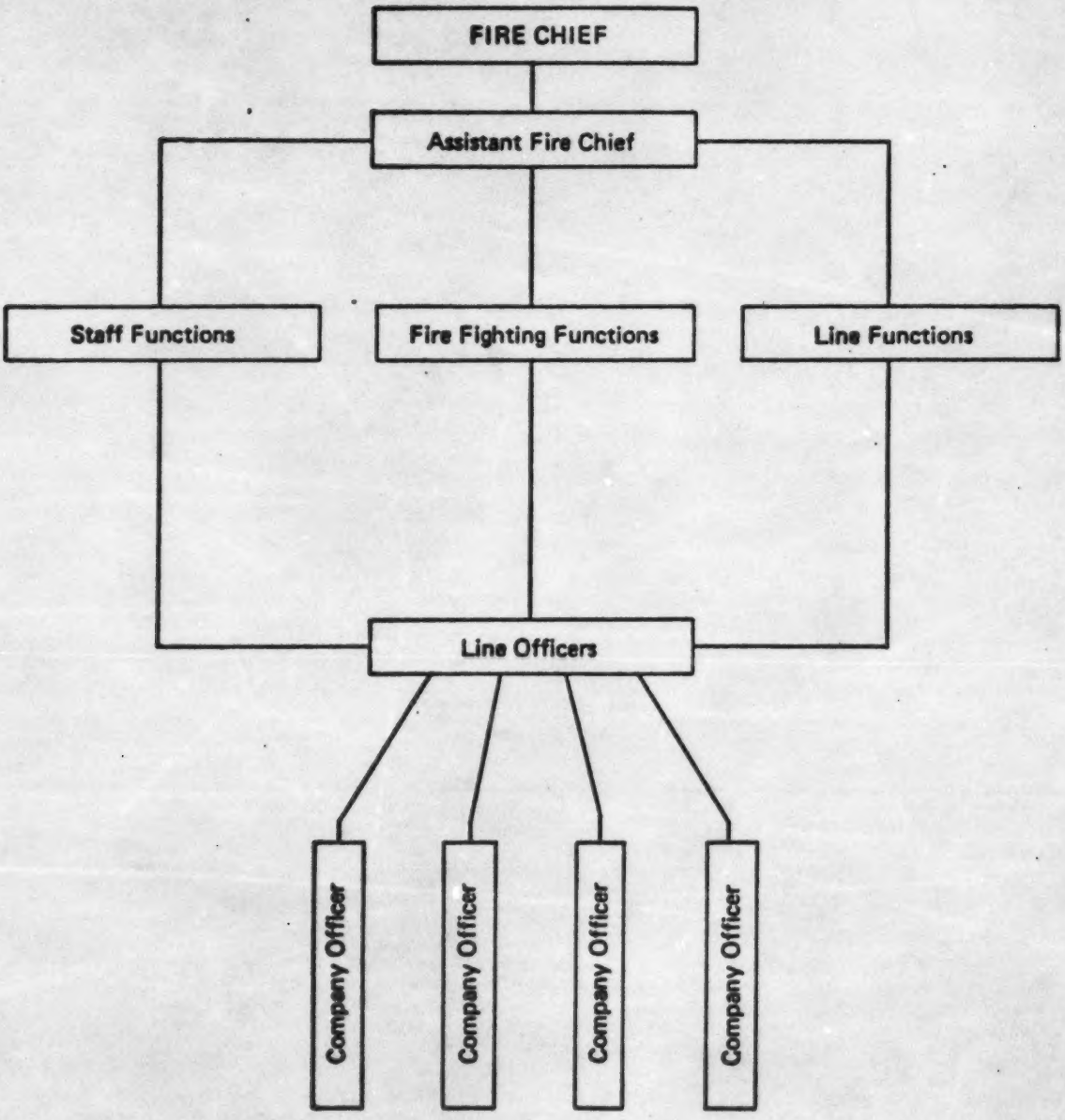


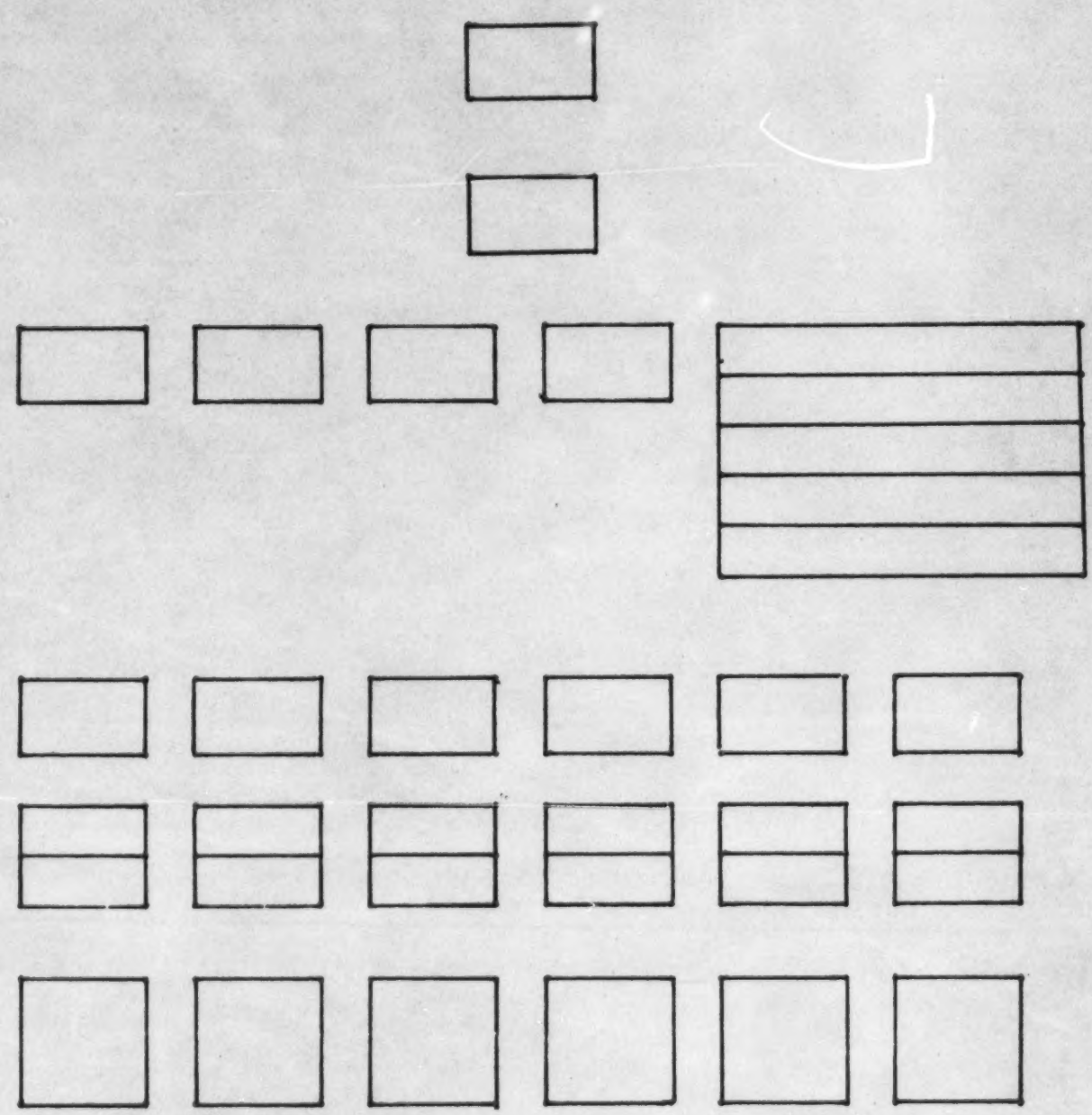
A TYPICAL ORGANIZATION CHART FOR A LARGE VOLUNTEER FIRE DEPARTMENT


FIRE CHIEF
Non-Fire Fighting Functions
Staff Officers For Staff Functions
Fire Prevention
Fire Police
Communications
Finance
Property
Auxiliary Enterprises
Assistant Fire Chief
Board Of Staff Officers
District Line Officers With Staff Functions
Training
A. Training Officer for each district
or
B. Training Officer for each subject
Fire Fighting Functions
Line Officers
District No. 1 District Chief and Sufficient Company Officers for each Fire Company
District No. 2 District Chief and Sufficient Company Officers for each Fire Company
District No. 3 District Chief and Sufficient Company Officers for each Fire Company
District No. 4 District Chief and Sufficient Company Officers for each Fire Company

This organization example may, to some degree, be adapted to a larger city with an all volunteer fire department. Its similarity to a large paid department is obvious. The number of fire stations, fire companies, and districts will regulate the number of volunteer firefighters and the number of firefighters will regulate the training requirements.

A TYPICAL ORGANIZATION CHART FOR A SMALL PAID OR VOLUNTEER FIRE DEPARTMENT





DIRECTIONS: Fill in the blanks with the rank or position that will best indicate the organization of your department. Connect the blanks utilized with lines showing the chain of command.

ELECTRICAL WIRING

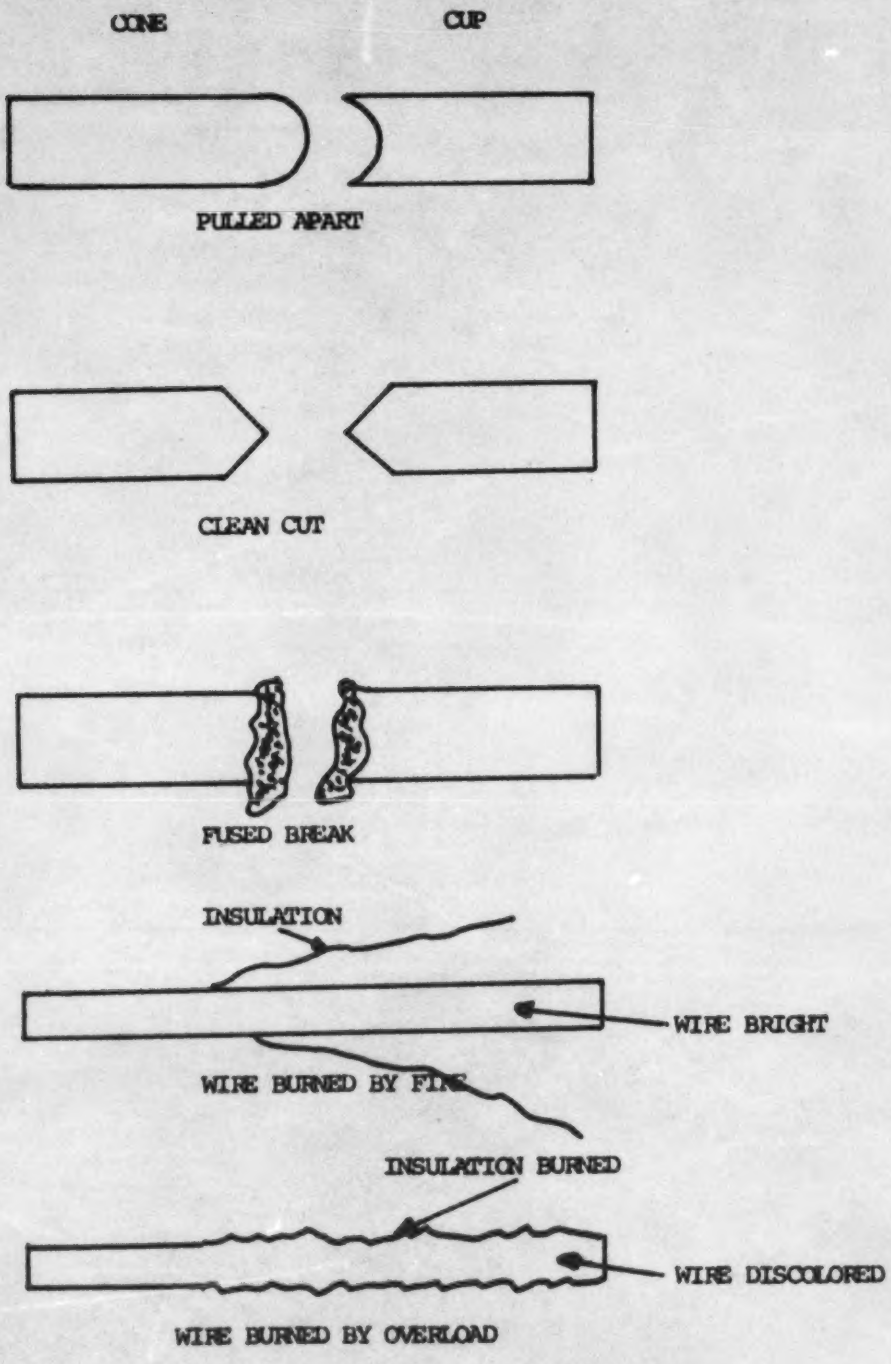


Fig. 1

FIRE HAZARD ANALYSIS

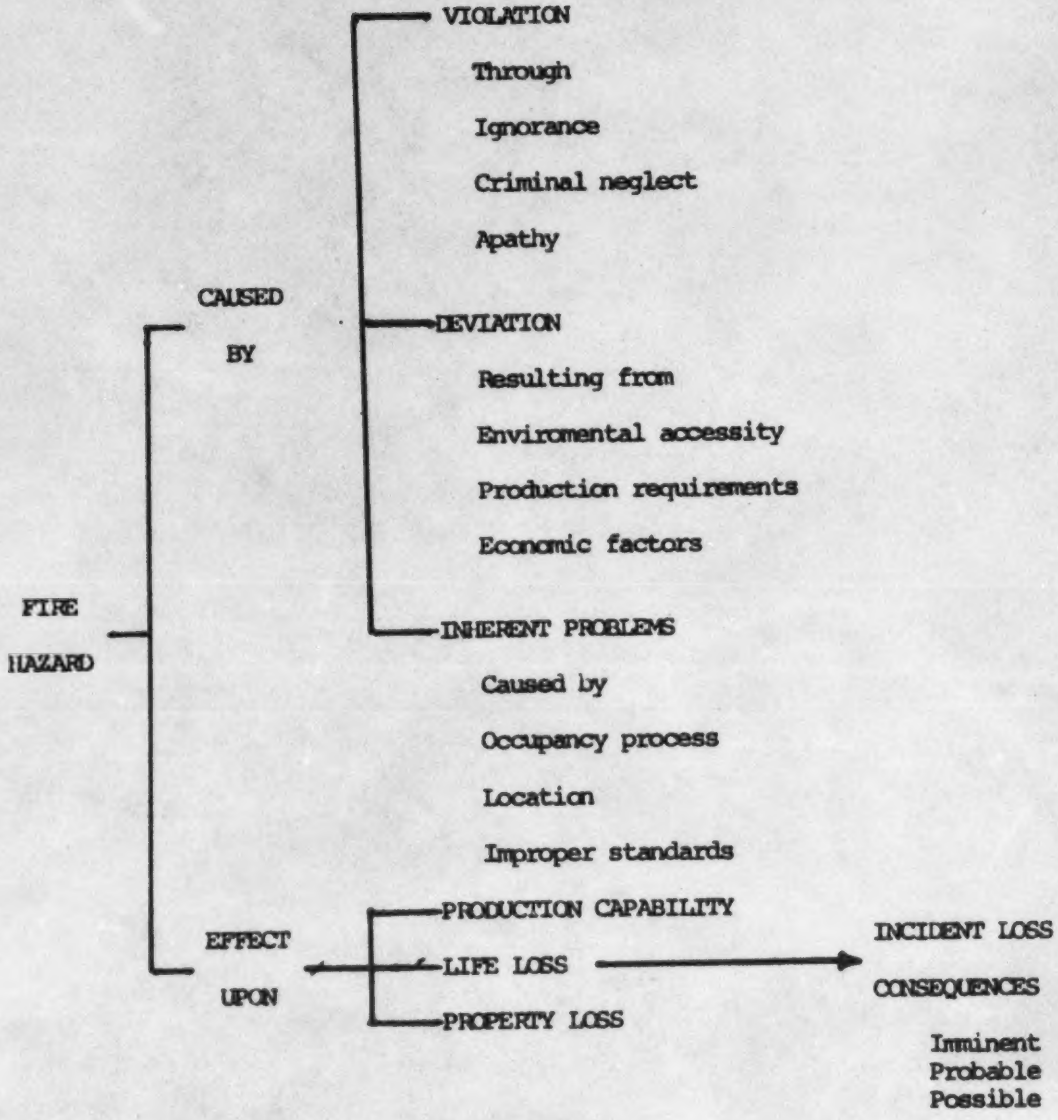


Fig. 1

FIRE CAUSE ANALYSIS

FUEL SUPPLY	HEAT SOURCE	HAZARDOUS ACT
Flammable Liquids	Open Flames, Torches, Matches, cigarettes, ovens, heaters (including open element electric heaters.	Improper smoking habits, diposal of smoking materials. Careless handling of flame.
Compressed Gas	Heating and cooking equipment Airconditioning and ventilating systems	Improper installation, use and maintenance of tools and equipment
Flammable/Combustible Solids and Dusts	Friction-hot bearings, rubbing belts, grinding, shredding, polishing, cutting and drilling	Do-it-yourself projects improper wiring circuitry and protective devices
Explosives	Electrical arcing and sparking Lighening, static	Improper storage and handling of flammable liquids, gases and combustible solids. Failure to properly protect and process stored items.
Oxidizing Materials	Chemical reactions and processes	

Fig. 1

DETERMINING THE FIRE CAUSE

GENERAL FACTS

Street address _____ City or town _____

Person making the survey _____ Date of survey _____

Occupied by _____

Date of fire _____ Time of fire _____

Weather, at the time of fire

Wind velocity _____ m.p.h. Wind direction _____

Humidity _____ % Atmospheric temperature _____

Weather conditions at the time of the fire (circle the condition)

Rain Ice Snow Thunderstorm Clear

Other conditions _____

Occupancy of the building (circle the occupancy)

Assembly	Business	Educational
High hazard	Industrial	Institutional
Mercantile	Residential	Storage

Mixed (describe) _____

Other _____

Materials of construction (examples)

Concrete block, stone, brick, brick veneer, wood frame, wood frame iron clad, metal frame iron clad, hollow tile

_____

_____

LOCATING THE AREA OF ORIGIN

AREA OF ORIGIN

Section of the building damaged _____

_____

Section damaged by: (circle one)

Fire Heat Explosion

Highest point of fire travel _____

_____

Physical state of fuel burned:

Heavy solids _____ Flimsy solids _____

Gaseous _____ Flammable liquids _____

Fire travel through openings (circle one)

Vertical Horizontal Walls Ceilings Floors

Heat transfer by (circle one)

Conduction Convection Radiation Flame contact

Burn through points:

Interior _____

Exterior _____

Heat indications - location of the greatest:

Depth of Char _____

Heat intensity _____

Spalled building materials _____

Burning _____

Location of heat line _____

Location of the area of origin _____

_____

LOCATING THE POINT OF ORIGIN

POINT OF ORIGIN

Factors to be considered:

A. Occupants opinion of where the fire started _____

_____

What is the logical fuel source at this point ? _____

What is the logical heat source that caused ignition at this point ? _____

_____

B. Point of greatest burning intensity _____

_____

Determined by: (circle items that apply)

fire load depth of char spalled materials melted materials

What is the logical fuel source at this point ? _____

C. Point of lowest burning _____

_____

What is the logical fuel source at this point ? _____

What is the logical heat source that caused ignition at this point ? _____

_____

D. Path of fire travel:

From _____

To _____

What is the logical fuel source in this path ? _____

_____

What is the logical heat source that caused ignition in this path ? _____

_____

LOCATING THE POINT OF ORIGIN

POINT OF ORIGIN

From the logical fuel and heat sources that caused ignition which have been established in A,B,C, and D:

Locate point of origin _____

_____

_____

_____

THE CAUSE OF THE FIRE

Occupants opinion of how the fire started_____

_____

_____

Occupants description of all the materials at the point of origin:

_____

_____

_____

Information from firefighter, citizens and neighbors:

_____

_____

_____

Personal study of fuel and heat sources at point of origin

EXPLOSION

Explosions usually involve combustible gases, flammable liquid vapors, or explosives.

FLASH FIRE

Evidence of scorched materials over a wide area and not deeply charred.

Flash fires usually involve flammable vapors, gases, or flimsy solids.

EXTREMELY HOT FIRES

Evidence of deep char, spalled materials, and melted materials.

This type of fire usually involves fuels of high Btu content, such as oils, greases, chemicals, rubber, and combustible metals.

ELECTRICAL FIRES

This type of fire involves fires in electrical appliances, such as overheated irons, motors, wiring, TV sets, and radios.

THE CAUSE OF THE FIRE

HEATING APPLIANCE FIRES

Heating appliance has reference to furnaces, stoves, wall heaters, space heaters, and cook stoves.

INCENDIARY FIRES

THIS TYPE INCLUDES ALL FIRES THAT ARE NOT ACCIDENTAL IN NATURE.

CHECK FOR UNUSUAL CONDITIONS WHERE THE HEAT SOURCE MAY BE CONVEYED TO THE FUEL SOURCE.

Results of professional assistance _____

_____

_____

_____

_____

Conclusion as to cause of fire:

Original fuel involved _____

_____

Original heat source that caused ignition _____

_____

WHAT IS THE CAUSE ? _____

_____

_____

_____

_____